

3.0 EMISSIONS INVENTORY - OTHER NEPA PROJECTS AND WOGCC WELLS

The purpose of the cumulative impacts analysis is to present the total impacts from the proposed project, along with all anthropogenic existing sources within the selected source domain as of December 31, 1998, and other reasonably foreseeable development. Four pollutants, PM₁₀, PM_{2.5}, SO₂, and NO_x, are inventoried for the cumulative impacts analysis. Sources within the source domain as determined by BLM in consultation with the cooperating parties are included.

This section describes the emissions from two source categories. The first source category includes the addition or removal of gas wells in the source domain. Gas wells have been added to and removed from the region being modeled since the baseline year of 1995. The total quantity of gas production in the modeling domain (by county) between 1995 and 1998 is available through the Wyoming Oil and Gas Conservation Commission (WOGCC). Records are available through the BLM for wells considered in the category of reasonably foreseeable development (i.e., development projects with partially or fully completed National Environmental Policy Act (NEPA) documents, but with only partial or no field development as of January 1999).

The second category includes emissions from compression. Emissions from compression added or removed between 1995 and 1998 are assumed to be included in the permitted sources discussed in Section 4. Compression that is considered reasonably foreseeable development (i.e., not installed as of December 1998) is available from a combination of BLM and specific project representatives.

3.1 Production Emissions From Wells

3.1.1 July 1995 Through December 1998

To account for changes in the number of wells operating in the source domain, the WOGCC gas production records were retrieved for 1995 through 1998. Gas production is only available through August, 1998. Extrapolation of gas production is accomplished by assuming that the ratio of the total (January - December) 1998 production rate to the partial (January - August) 1998 production rate equals the ratio of the total (January - December) 1995 production rate to the partial (January - August) 1995 production rate, as shown in the equation below.

$$\frac{\text{Emissions (January - August)}_{1998}}{\text{Emissions (January - December)}_{1998}} = \frac{\text{Emissions (January - August)}_{1995}}{\text{Emissions (January - December)}_{1995}}$$

The gas production rates after extrapolation are shown in Table 3.1 for each county. The overall change in the amount of gas produced between 1995 and 1998 is assumed to be proportional to the emissions change from the measured baseline values (1995).

TABLE 3.1
GAS PRODUCTION RATES - WOGCC

County	1995	1998	1998-1995
Carbon	1,341,178	1,299,405	-41,773
Fremont	2,753,097	2,812,281	59,184
Lincoln	1,148,840	1,004,645	-144,195
Sublette	1,120,745	2,070,643	949,898
Sweetwater	5,753,208	4,627,431	-1,125,777
Uinta	6,039,715	5,161,659	-878,056
Total	18,156,783	16,976,064	-1,180,719

Only NO_x emissions are estimated for these wells, as SO₂ and particulate matter emissions are expected to be negligible. The NO_x emission factor developed from the PAP emissions inventory is based on annual well field production emissions (45 tons NO_x per year) and the estimated well field production rate of 350 MMCFD for 365 days per year. The resulting emission factor is 0.0004 tons/MMCF of gas produced. Table 3.2 shows the calculated emissions change from baseline by county. See Appendix C.

These countywide emissions are represented as area sources in the CALPUFF model. As shown in Figure 3.1, only the portion of the county with an abundance of gas wells is modeled.

TABLE 3.2
NO_x EMISSIONS FROM WOGCC WELLS

County	NO _x Emissions (TPY)
Carbon	-0.015
Fremont	0.021
Lincoln	-0.051
Sublette	0.333
Sweetwater	-0.394
Uinta	-0.308
Total	-0.414

3.1.2 Reasonably Foreseeable Development (Post-1998)

Sources expected to be installed after December 31, 1998, which have been specified in a NEPA document are categorized as reasonably foreseeable development. The sources associated with published draft EIS's, final EIS's, or ROD's include wells authorized in natural gas NEPA document project areas shown in Figure 3.2 and tabulated in Table 3.3.

Only NO_x emissions are estimated from these sources, as SO₂ and particulate matter emissions are expected to be insignificant. NO_x emissions are calculated using the number of wells remaining to be drilled after December 1998, as provided by the BLM, and appropriate emission factors. The Continental Divide emission factor is 0.08 tons per year per well.¹⁴ The Jonah II emission factor of 0.065 tons per year per well is taken from the *Final Environmental Impact Statement Jonah Field II Natural Gas Project*. For the remaining projects, a NO_x emission factor of 0.065 tons per year per well is also used.¹⁵ The resulting NO_x emissions are summarized in Table 3.3 and Appendix C.

¹⁴ Information from TRC, (3/9/99 email). Based on a 0.25 MMBtu/hr separator heater operating fulltime from October through March and a 0.125 MMBtu/hr dehy heater operating halftime, year round, and a NO_x emission factor of 100 lb/MMSCF.

¹⁵ Based on PAP calculated emissions per well.

TABLE 3.3
RFD EMISSIONS FROM OTHER NEPA WELLS

Project	Map Reference	Dehydrator and Separator Heaters Emissions		
		Number of wells	NO _x Emission Factor (TPY/well)	Emissions (TPY)
Hoback Basin	A	10	0.065	0.7
Upper Green River	B	10	0.065	0.7
Soda Unit	C	18	0.065	1.2
Castle Creek Unit	D	10	0.065	0.7
Riley Ridge	E	224	0.065	14.6
CAP	F	445	0.065	28.9
Jonah II	G	321	0.065	20.9
Burley	H	16	0.065	1.0
Bird Canyon	J	8	0.065	0.5
East LaBarge	K	9	0.065	0.6
Fontenelle Reservoir*	L	1,141	0.065	74.2
Moxa Arch	M	1,227	0.065	79.8
Road Hollow	N	6	0.065	0.4
Hickey Mountain	O	50	0.065	3.3
Stagecoach Draw	P	59	0.065	3.8
Essex Mountain	Q	3	0.065	0.2
Bravo	R	4	0.065	0.3
Hay Reservoir	S	2	0.065	0.1
Continental Divide/Wamsutter II	T	3,000	0.08	249.2
Mulligan Draw	U	23	0.065	1.5
Creston/Blue Gap	V	175	0.065	11.4
Sierra Madre	W	16	0.065	1.0
Miscellaneous Wells - West	X	185	0.065	12.0
Miscellaneous Wells - East	Y	15	0.065	1.0
Dripping Rock/Cedar Break	Z	34	0.065	2.2
South Baggs	AA	90	0.065	5.9
Jack Morrow Hills	AB	110	0.065	7.2
Total		7,211		523

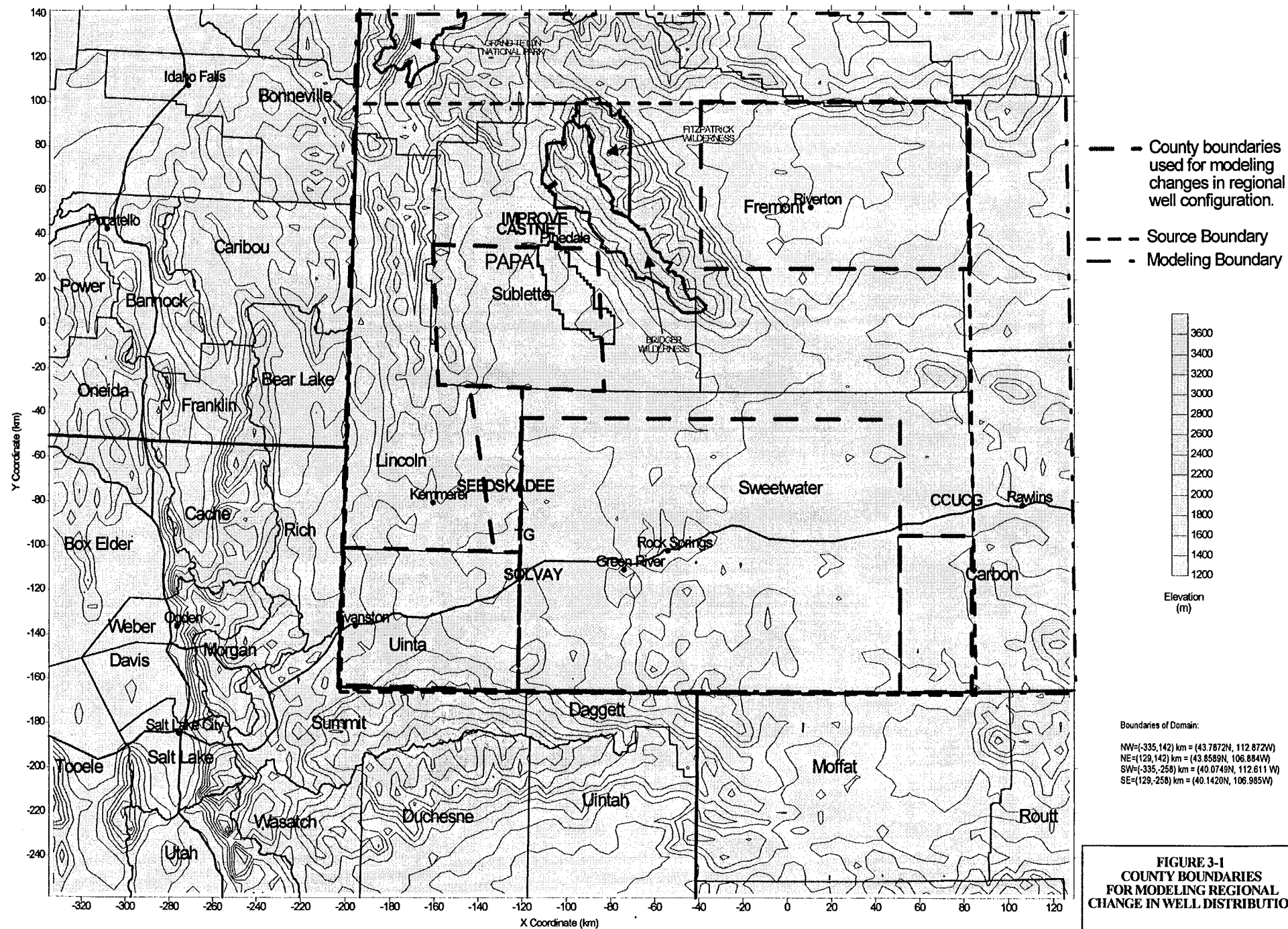
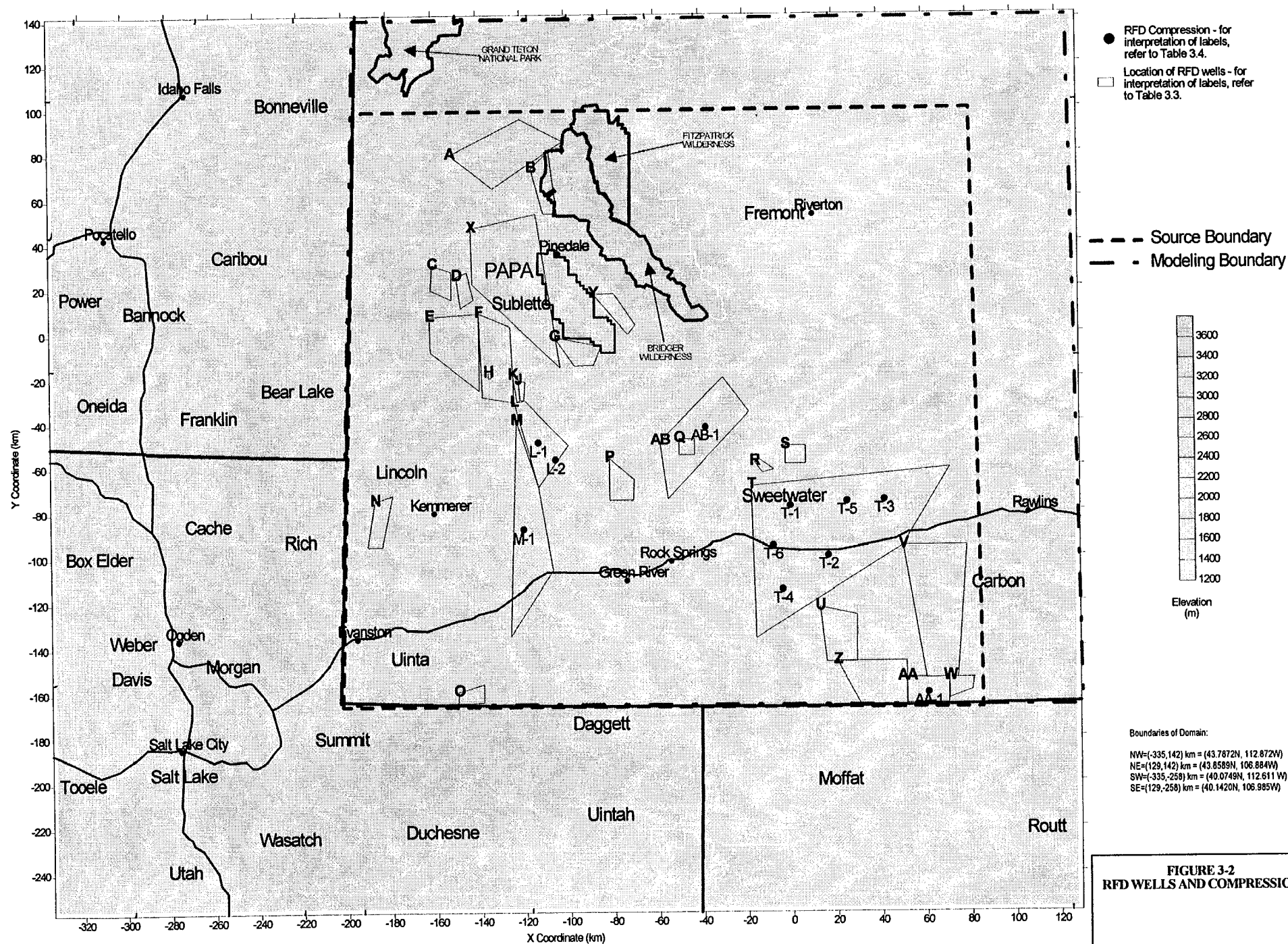


FIGURE 3-1
COUNTY BOUNDARIES
FOR MODELING REGIONAL
CHANGE IN WELL DISTRIBUTION



AIR SCIENCES INC.
 LAKEWOOD, COLORADO



AIR SCIENCES INC.
LAKEWOOD, COLORADO

3.2 Compression and Gas Processing Emissions

3.2.1 July 1995 Through December 1998

It is assumed that all compressors and gas processing equipment installed between July 1995 and December 1998 are included in the emissions inventory encompassing permit actions (see Section 4).

3.2.2 Reasonably Foreseeable Development (Post-1998)

Sources expected to be installed after December 31, 1998, that have been specified in a NEPA document are categorized as reasonably foreseeable development. The sources associated with published draft EIS's, final EIS's, or ROD's include compression authorized in natural gas NEPA document project areas shown in Figure 3.1 and tabulated in Table 3.4.

Five of these projects include compressors that have not yet been installed. Emissions from this as of yet uninstalled compression are accounted for in this section. Again, only NO_x emissions are calculated because PM₁₀ and SO₂ emissions are expected to be negligible from these gas-fired compressors. A conservative emission factor of 1.5 g/hp-hr is assumed, as shown in Table 3.4.

The compressors have been randomly located within the appropriate project boundary, shown in Figure 3.2. Appendix D contains the emissions, as well as the assumed stack parameters for each compressor.

**TABLE 3.4
COMPRESSION EMISSIONS**

Other EIS Sources	Map Reference	Compression		
		Compression (hp)	NO _x Emission Factor (g/hp-hr)	Emissions (TPY)
Fontenelle Reservoir	L-1	13,692	1.5	198
	L-2	13,692	1.5	198
Moxa Arch	M-1	17,066	1.5	247
Continental Divide/Wamsutter II	T-1	10,000	1.5	145
	T-2	10,000	1.5	145
	T-3	10,000	1.5	145
	T-4	10,000	1.5	145
	T-5	10,000	1.5	145
	T-6	20,000	1.5	290
South Baggs	AA-1	3,000	1.5	43
Jack Morrow Hills	AB-1	3,480	1.5	50
Total		120,929		1,752

In addition, Continental Divide/Wamsutter II plans to install a gas processing facility. This facility, which will emit NO_x, PM₁₀, and PM_{2.5}, will be collocated with the 20,000 hp compression facility, and for purposes of this analysis are assumed to exit through the compressor stack. Emissions from this facility are summarized in Table 3.5 and Appendix D.

**TABLE 3.5
GAS PROCESSING FACILITY EMISSIONS**

Project	Gas Plant Emissions (tons/year)			
	PM _{2.5}	PM ₁₀	NO _x	SO ₂
Continental Divide/Wamsutter II*	2.00	2.00	16.70	0.00